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Isoperimetric properties of Euclidean boundary moments of a simply connected domain

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Abstract

We consider integral functionals of a simply connected domain which depend on the distance to the domain boundary. We prove an isoperimetric inequality generalizing theorems derived by the Schwarz symmetrization method. For L p -norms of the distance function we prove an analog of the Payne inequality for the torsional rigidity of the domain. In compare with the Payne inequality we find new extremal domains different from a disk. © 2013 Allerton Press, Inc.

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Keywords

Bonnesen inequality, distance function to the boundary of a domain, Euclidean moments of a domain with respect to the boundary, isoperimetric inequalities, isoperimetric monotonicity, torsional rigidity